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FLOOD INSURANCE STUDY

ORIGINAL

CITY OF SPARTA, WISCONSIN

MONROE COUNTY

REVISED:

JUNE 17, 1986

Federal Emergency Management Agency

COMMUNITY NUMBER - 550290

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Individual components of this Flood Insurance Study (i.e., text, tables, profiles, and maps) are all subject to revision as additional data become available. Because revised components may be issued separately, study users should consult the community map repository for those components that are currently effective.

In cases where this Flood Insurance Study and any components thereof warrant revision, a Revisions Description section may be incorporated into this text. When applicable, study users should refer to the Revisions Description to obtain pertinent data and information concerning revisions.

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FLOOD INSURANCE STUDY

CITY OF SPARTA,
MONROE COUNTY WISCONSIN

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Sparta, Monroe County, Wisconsin, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Sparta to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Carl C. Crane, Inc. for the Federal Insurance Administration under Contract No. H-4785. This study was completed in May 1979.

1.3 Coordination

Streams requiring detailed study were identified at a meeting attended by representatives of the Study Contractor, the FIA, the Wisconsin Department of Natural Resources and representatives of the City of Sparta on April 20, 1978. Results of the hydrologic analyses were coordinated with the Wisconsin Department of Natural Resources, Flood Plain Management Section, and the Engineering Department of the City of Sparta.

On April 15, 1980, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, the FIA, and community officials.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Sparta, Monroe County, Wisconsin. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction through May 1984. The scope and methods of study were proposed to and agreed upon by the FIA and the City of Sparta.

The flooding sources studied by detailed methods are listed below:

a. the La Crosse River, from the southwestern corporate limit to the eastern corporate limit, a distance of about 3.5 river miles;

b. Beaver Creek, from its mouth at the La Crosse River to the northern corporate limit, a distance of about 1.0 river mile; and

c. Farmers Valley Creek, from its mouth at the La Crosse River to the southern corporate limit, a distance of about 1.0 river mile.

2.2 Community Description

The City of Sparta is located in the west-central portion of Wisconsin in the west-central portion of Monroe County. The City of Sparta is bordered on all sides by the unincorporated areas of Monroe County. The total land area contained within the city limits is approximately 4.5 square miles. Sparta was incorporated in 1883. In 1970 its population was listed as 6,258 as obtained from the 1973 State of Wisconsin Blue Book (Reference 1).

The climate in west-central Wisconsin is characterized by wide variations in temperature. Average summer and winter temperatures for the years 1969 to 1973 ranged from 73 degrees Fahrenheit (F.) to 7 degrees F. respectively. Average annual precipitation of the region is 30.0 inches with an average recorded snowfall of 48 inches. Precipitation is normally higher in the spring and summer (References 1 and 2).

The surface of Monroe County is quite uneven and hilly in the southern part, but quite level in the northeastern and northern part. Valley bottom land characterizes the La Crosse River in the vicinity of Sparta. The valley bottoms range in altitude between 800 and 1,000 feet, and the uplands, between 1,200 and 1,350 feet. The soils are generally sands and sandy loams in the alluvial bottoms and silt loams in the upland area.

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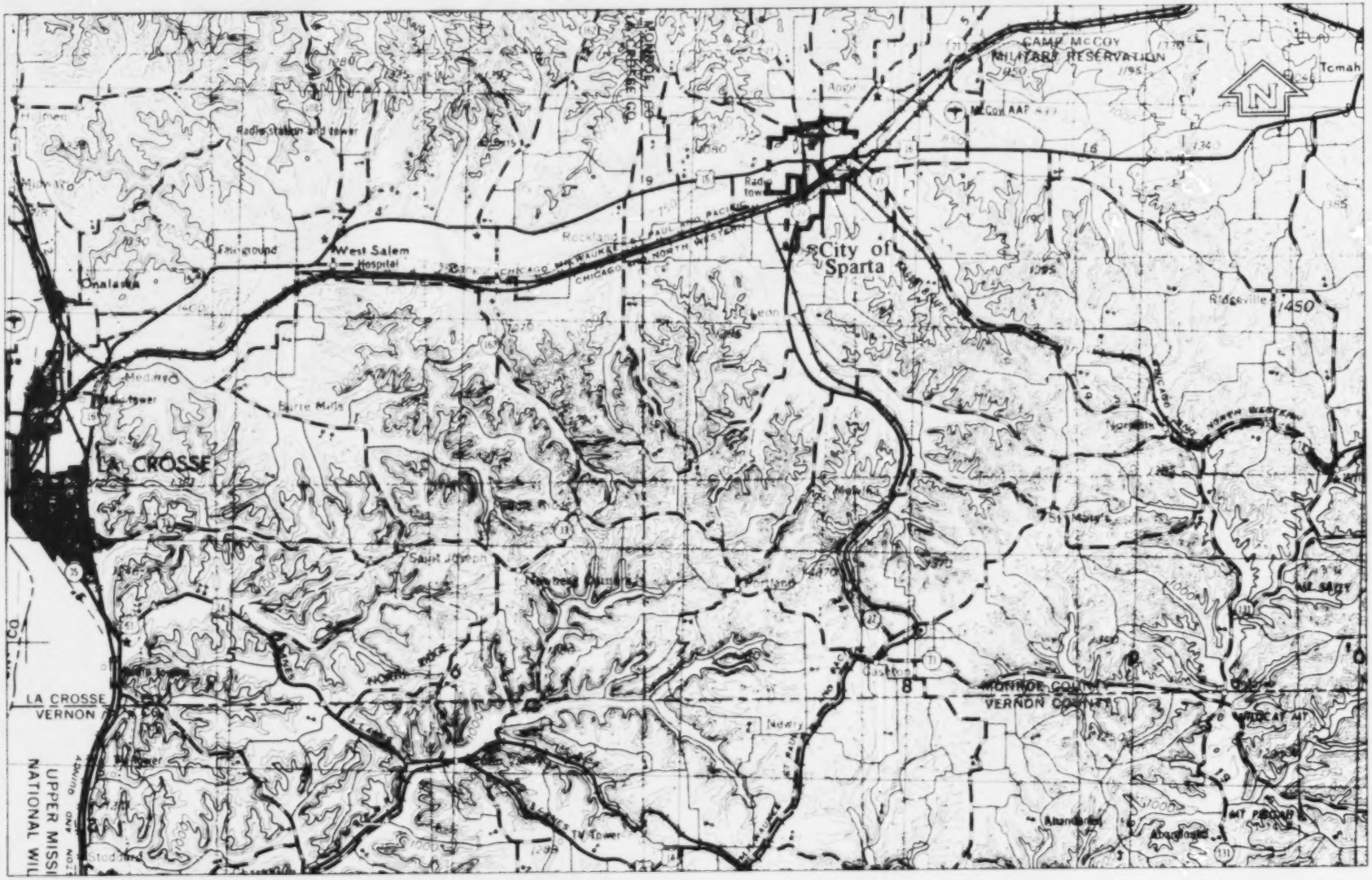

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI

(MONROE CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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The geological formations are the Upper Cambrian (Potsdam) sandstone, generally outcropping in the northern half of the county, and the Lower Magnesian limestone overlying the sandstone only in the southern half of the county. The county contains no glacial deposits, but the broad, flat-bottomed valleys are filled to a variable depth with alluvial sand and gravel, and the uplands are covered with a variable amount of loess (Reference 3).

The La Crosse River flows southwesterly through the city. The total drainage area is approximately 106 square miles upstream of the corporate limits. Beaver Creek flows southerly through the city. The total drainage area is approximately 18.5 square miles upstream of the corporate limits. Farmers Valley Creek flows northerly through the city. The total drainage area is approximately 24 square miles.

About 55 percent of the total acreage in Sparta is in residential use, with approximately 10 percent in recreational use, 20 percent open lands, and the remainder in all other uses (including commercial, industrial and transportation). Development is residential within each of the flood plains studied in detail.

2.3 Principal Flood Problems

The history of flooding on the streams within the City of Sparta indicates that flooding may occur during any season. Most major floods in the La Crosse River have occurred in the early spring and are usually the result of spring rains and/or snowmelt. Beaver Creek and Farmers Valley Creek are smaller basins and, therefore, quite responsive to locally heavy rains. Floods can occur on these creeks during any of the warmer months.

The U.S. Geological Survey (USGS) has maintained a recording gage (No. 5-3830) on the La Crosse River approximately two miles west of West Salem since 1938. A non-recording gage was in operation from 1914 to 1938, 30 feet downstream of the present site. Three floods have been recorded that had peak discharges exceeding 5,700 cubic feet per second (cfs). The largest occurred August 6, 1935 with a peak discharge of 8,200 cfs. The expected probability of a flood of this magnitude is approximately once every 85 years. The last major flood on the La Crosse River occurred July 2, 1978 when a peak of 7,600 cfs was registered at the gage. This has an expected probability of once every 60 years. On February 8, 1966 a flood having a frequency of once every 22 years occurred. This event reached a peak discharge of 5,940 cfs.

No other stream gages exist in the Sparta area. Although flooding has occurred on both Farmers Valley Creek and Beaver Creek in the past few years, there have been no estimates made of either peak discharges or expected recurrence intervals.

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2.4 Flood Protection Measures

No flood protection measures exist in the City of Sparta, with the possible exception of the Perch Lake dam on the La Crosse River. This dam was designed primarily for hydroelectric power generation and recreation. Although it does not have the storage capacity to attenuate the discharge peaks to any appreciable degree, it does provide minimal flood protection.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten), and for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

For the detailed study of the La Crosse River the peak discharges used were obtained from the Monroe County Flood Insurance Study (Reference 4). The discharges were derived in that report from the Flood Plain Information Report for the La Crosse area (Reference 5). They were adjusted in this study to reflect the reduced drainage area upstream of the study area, using the Area-Ratio Method with a 0.6 exponent (Reference 6).

For the detailed study of Beaver Creek and Farmers Valley Creek the hydrologic analysis was investigated utilizing the methodology outlined in the National Engineering Handbook (Reference 7). Using this procedure, the time of concentration and time of peak were computed for the basins and a unit hydrograph was developed. The expected 6-hour rainfall for the desired frequency events were obtained from Technical Paper No. 40 (Reference 2) and distributed into 30-minute amounts as described in the SCS criteria for design storms. A 6-hour duration storm was chosen since it was determined

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to be the "effective duration" for areas having an average annual precipitation of approximately 30 inches.

Rainfall excess was computed from accumulated rainfall using an SCS runoff equation which equates runoff as a function of soil type, antecedant moisture condition, and land use (Reference 7). Utilizing this precipitation data and the derived unit hydrographs, an outflow hydrograph was computed for each basin.

The State's Multiple Regression Equations with drainage area, main channel slope, percent lakes and marsh, areal factor and mean snowfall as the independent variables were also investigated and compared with the results of the SCS method. The derivation of these equations is described in detail in Estimating Magnitude and Frequency of Floods in Wisconsin by Duane H. Conger (Reference 8).

The results of these studies of peak discharges were also compared with data obtained from similar gaged basins. These discharges reflect the present land use within the basin. Increased development without regard to changes in the runoff characteristics of the basin could substantially increase these flows.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
LA CROSSE RIVER					
At west corporate limit	150	2,650	4,100	4,800	6,550
Upstream Perch Lake	106	2,175	3,400	3,950	5,400
BEAVER CREEK					
At mouth	18.5	750	1,350	1,600	2,200
FARMERS VALLEY CREEK					
At mouth	24.3	1,250	2,200	2,600	3,700

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

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Cross section and bridge elevation data and structural geometry for the backwater analyses of the flooding sources studied were obtained by field surveys by the Study Contractor. The channel soundings were also obtained by field measurement.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Channel roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgment and based on field observations of the streams and flood plain areas. Roughness values for the main channel of the La Crosse River range from 0.025 to 0.045 with flood plain roughness values ranging from 0.07 to 0.11 for all floods. On Beaver Creek, roughness values for the main channel range from 0.040 to 0.045 with flood plain roughness values ranging from 0.05 to 0.10. On the Farmers Valley Creek, main channel roughness value used 0.045 with flood plain roughness values ranging from 0.07 to 0.10 for all floods.

Starting water-surface elevations for each flood frequency studied for the La Crosse River were obtained from profiles previously developed as part of the Monroe County Flood Insurance Study (Reference 4). Lake stages for Perch Lake were computed for a range of discharges and were used as starting water-surface elevations for the portion upstream of the dam. Starting water-surface elevations for the Farmers Valley Creek were computed by a normal depth analysis utilizing the computer program, Hydraulics of Bridge Waterways (Reference 9). In the case of Beaver Creek, starting water-surface elevations were derived by comparing normal La Crosse River stage, 10-year computed water-surface elevation, and 100-year computed water-surface elevation with elevations derived from the normal depth analysis utilizing the computer program, Hydraulics of Bridge Waterways (Reference 9).

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the COE HEC-2 step-backwater computer program (Reference 10). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals (Exhibit 1).

Just upstream from the Farmers Valley Creek confluence with the La Crosse River is a situation where a ridge of high ground runs between the two streams and causes a weir flow over the ridge.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

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All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using topographic maps enlarged to a scale of 1:4800, with a contour interval of 20 feet (Reference 11). No flood boundaries are shown upstream or downstream of South Water Street because the 500-year flood is contained within the culvert in this region.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the Wisconsin Department of Natural Resources has established a policy that limits encroachment in the flood plain to 0.1 foot (Reference 12).

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The floodways in this study were developed to reflect the existing effective flow limits. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was computed (Table 2). Portions of the floodway for the La Crosse River and Farmers Valley Creek extend beyond the corporate limits.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

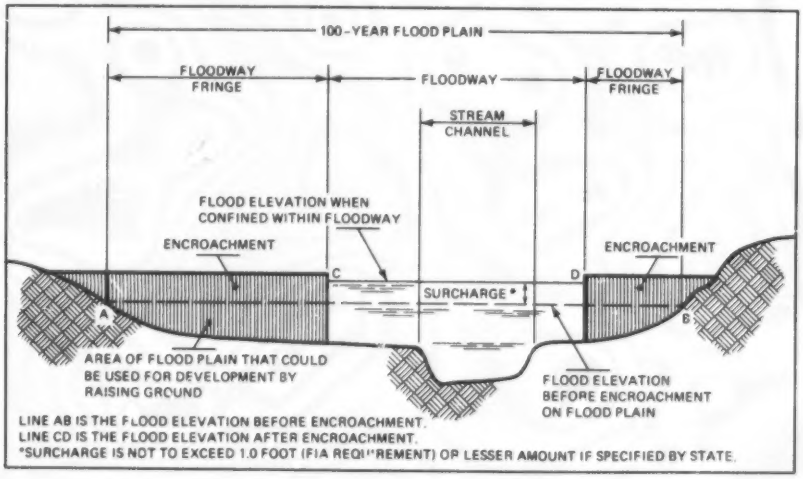
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FIGURE 2 - Floodway Schematic

The floodways in this report are recommended to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source affecting the City of Sparta.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
LA CROSSE RIVER								
A	38.01	1207[2]	3658	1.5	762.6	762.6	762.6	0.0
B	38.31	1218[2]	4504	1.2	763.7	763.7	763.7	0.0
C	38.92	455	1553	3.4	765.9	765.9	765.9	0.0
D	39.03	670	2809	1.7	766.7	766.7	766.7	0.0
E	39.21	510	2052	2.3	767.2	767.2	767.2	0.0
F	39.45	400	1124	4.3	768.5	768.5	768.5	0.0
G	39.53	255	826	5.8	769.0	769.0	769.0	0.0
H	39.74	370	1705	2.8	771.4	771.4	771.4	0.0
I	39.83	295	1815	2.6	771.5	771.5	771.5	0.0
J	39.93	520	1552	3.1	772.1	772.1	772.1	0.0
K	40.02	260	1426	3.4	772.2	772.2	772.2	0.0
L	40.09	190	1147	4.2	772.8	772.8	772.8	0.0
M	40.18	320	2037	2.4	773.3	773.3	773.3	0.0
N	40.31	390	1832	2.6	773.8	773.8	773.8	0.0
O	40.40	110	1104	4.4	774.1	774.1	774.1	0.0
P	40.46	210	927	5.2	774.3	774.3	774.3	0.0
Q	40.65	585	2989	1.3	776.5	776.5	776.5	0.0
R	40.91	615	3500	1.1	776.6	776.6	776.6	0.0
S	41.16	750	1960	2.0	778.3	778.3	778.3	0.0
T	41.46	515	2277	1.7	780.9	780.9	780.9	0.0

[1]FEET ABOVE MOUTH
[2]THIS WIDTH EXTENDS WITHIN AREA NOT INCLUDED

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

FLOODWAY DATA

LA CROSSE RIVER

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
BEAVER CREEK								
A	0.08	415	906	1.8	773.2	772.0[3]	772.0	0.0
B	0.10	220	627	2.6	773.2	772.3[3]	772.3	0.0
C	0.15	110	361	4.4	773.5	773.5	773.5	0.0
D	0.23	80	315	5.1	774.9	774.9	774.9	0.0
E	0.31	80	300	5.3	776.3	776.3	776.3	0.0
F	0.38	60	332	4.8	777.9	777.9	777.9	0.0
G	0.47	42	260	6.2	780.3	780.3	780.3	0.0
H	0.63	115	1131	1.4	781.3	781.3	781.3	0.0
I	0.77	35	317	5.1	782.4	782.4	782.4	0.0
J	0.92	80	282	5.7	784.0	784.0	784.0	0.0
K	1.04	140	747	2.1	786.7	786.7	786.7	0.0
FARMERS VALLEY CREEK								
A	0.05	120	571	4.6	773.9	773.0[3]	773.0	0.0
B	0.07	50	361	7.2	774.5	774.5	774.5	0.0
C	0.13	120	1065	2.4	775.7	775.7	775.7	0.0
D	0.31	365	1194	2.2	777.2	777.2	777.2	0.0
E	0.36	45	308	8.0	778.6	778.6	778.6	0.0
F	0.37	50	358	7.3	779.4	779.4	779.4	0.0
G	0.53	190	652	4.0	782.1	782.1	782.1	0.0
H	0.71	102[2]	492	5.3	784.8	784.8	784.8	0.0
I	0.87	174[2]	775	3.4	786.8	786.8	786.8	0.0
J	0.97	114[2]	570	4.6	788.3	788.3	788.3	0.0

[1]FEET ABOVE MOUTH
[2]THIS WIDTH IS WITHIN AREA NOT INCLUDED
[3]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM LA CROSSE RIVER

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

FLOODWAY DATA

BEAVER CREEK - FARMERS VALLEY CREEK

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5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the City of Sparta are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 4).

5.2 Flood Hazard Factors

The FHF is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the City of Sparta was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zones A3, A4, A5: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF.

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Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Sparta is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

A Flood Insurance Study for the unincorporated areas of Monroe County is in exact agreement with this study (Reference 4). No other studies were found to exist at the time of this report.

A Flood Hazard Boundary Map has been published by the Federal Insurance Administration (Reference 13). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management, One North Dearborn Street, Chicago, Illinois 60602.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
LA CROSSE RIVER							
REACH 1	0001,0002	–1.3	–0.4	0.8	015	A3	VARIES–SEE MAP
REACH 2	0002	–2.5	–0.7	1.3	025	A5	VARIES–SEE MAP
REACH 3	0002	–1.3	–0.3	0.8	015	A3	VARIES–SEE MAP
BEAVER CREEK							
REACH 1	0002	–2.2	–0.6	1.0	020	A4	VARIES–SEE MAP
FARMERS VALLEY CREEK							
REACH 1	0002	–2.6	–0.8	1.7	025	A5	VARIES–SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

FLOOD INSURANCE ZONE DATA

LA CROSSE RIVER - BEAVER CREEK - FARMERS VALLEY CREEK

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8.0 REFERENCES AND BIBLIOGRAPHY

1. Wisconsin Legislative Reference Bureau, The State of Wisconsin 1973 Blue Book, 1973.

2. U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, January 1963.

3. State of Wisconsin, The Underground and Surface Water Supplies of Wisconsin, Samuel Weidman and Alfred Schultz, 1915.

4. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Monroe County, Wisconsin, (in progress).

5. U.S. Army Corps of Engineers, St. Paul District, Flood Plain Information Report for La Crosse, Wisconsin, April 1970.

6. Chow, Ven Te, Open Channel Hydraulics, Fifth Edition, McGraw-Hill Book Company, Inc., 1959.

7. U.S. Department of Agriculture, Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972.

8. Conger, Duane H., Estimating Magnitude and Frequency of Floods in Wisconsin, 1971.

9. Wisconsin Department of Natural Resources, Bureau of Water Regulation and Zoning, Hydraulic Review of Natural or Constricted Waterways (Bridge or Culvert), Revised March 1978.

10. U.S. Army Corps of Engineers, Hydrologic Engineering Center, Computer Program 723-X6-L202A, HEC-2 Water-Surface Profiles, Davis, California, (updated) November 1976.

11. U.S. Geological Survey, 15 Minute Series Quadrangle Map, Scale 1:62500, Contour Interval 20 feet: Sparta, Wisconsin, 1947.

12. Wisconsin Department of Natural Resources, Wisconsin's Flood Plain Management Program, Chapter NR 116, Register No. 259, 1977.

13. U.S Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Sparta, Wisconsin, January 1974.

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9.0 REVISIONS DESCRIPTION (Revised: June 17, 1986)

9.1 Purpose

The purpose of this Flood Insurance Study Revisions Description is to incorporate new or revised data into this currently effective Flood Insurance Study for the City of Sparta, Monroe County, Wisconsin. This Revisions Description is intended to provide updated information that aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

9.2 Acknowledgments

The revised topographic information (Reference 1) for this Revisions Description was obtained from Fred G. Michaels & Associates. The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

9.3 Scope

The La Crosse River, Beaver Creek, and Farmers Valley Creek were revised to reflect the new topographic information.

9.4 Floodways

The floodways for the La Crosse River, Beaver Creek, and Farmers Valley Creek were revised based on the revised mapping submitted by Fred G. Michaels & Associates. The Wisconsin Department of Natural Resources reviewed and accepted these revised floodways.

Revised floodway widths were measured from the revised mapping. The results are tabulated at selected cross sections for each segment for which a floodway was computed and are presented in Table 2, Floodway Data.

9.5 Location of Data

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 300 South Wacker Drive, Chicago, Illinois 60606.

9.6 References and Bibliography

1. Aero-Metric Engineering, Inc., Orthophotographic Mapping, Scale 1:1200, Contour Interval 2 feet: Sparta, Wisconsin, December 1979.

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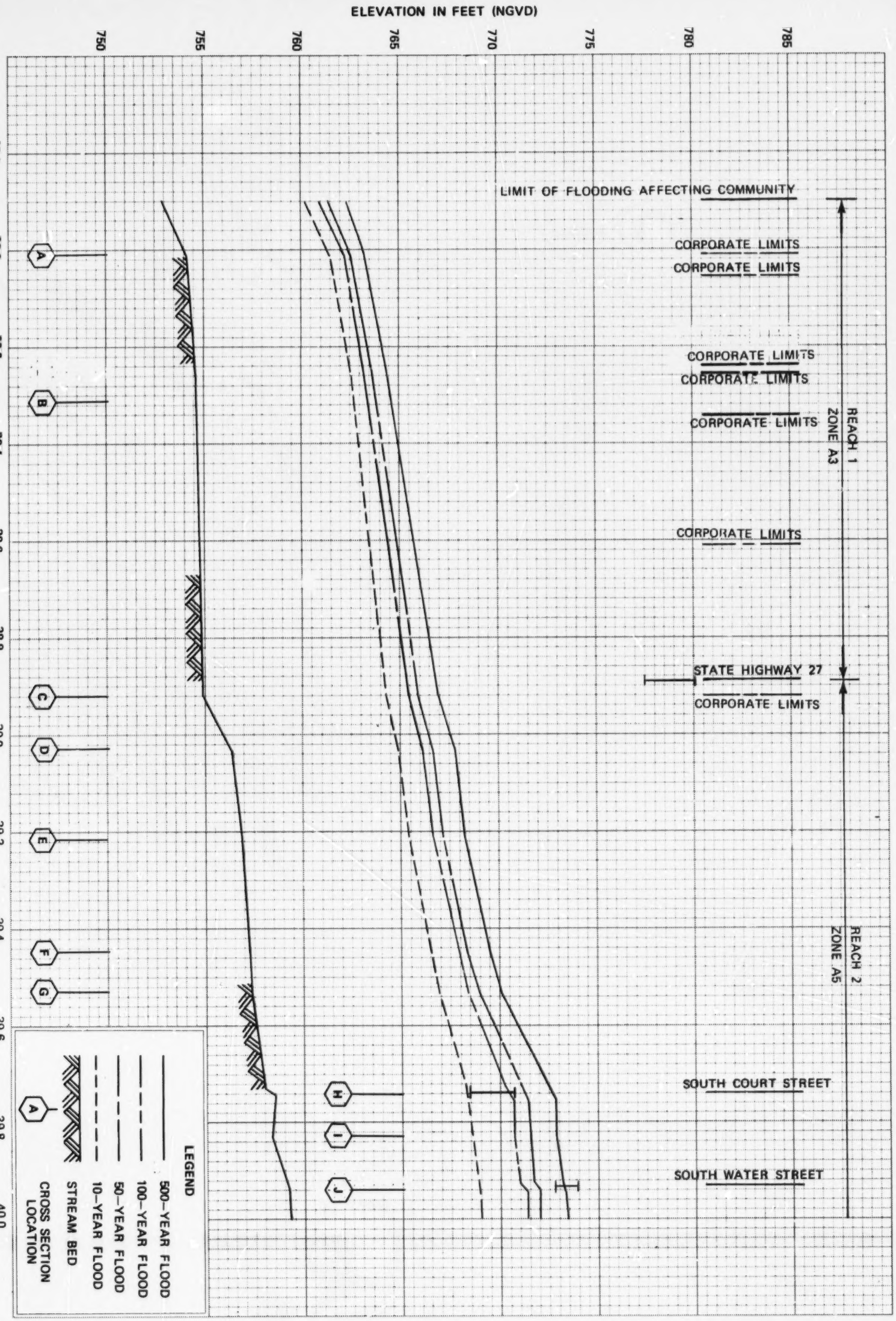

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FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

FLOOD PROFILES

LA CROSSE RIVER

01P

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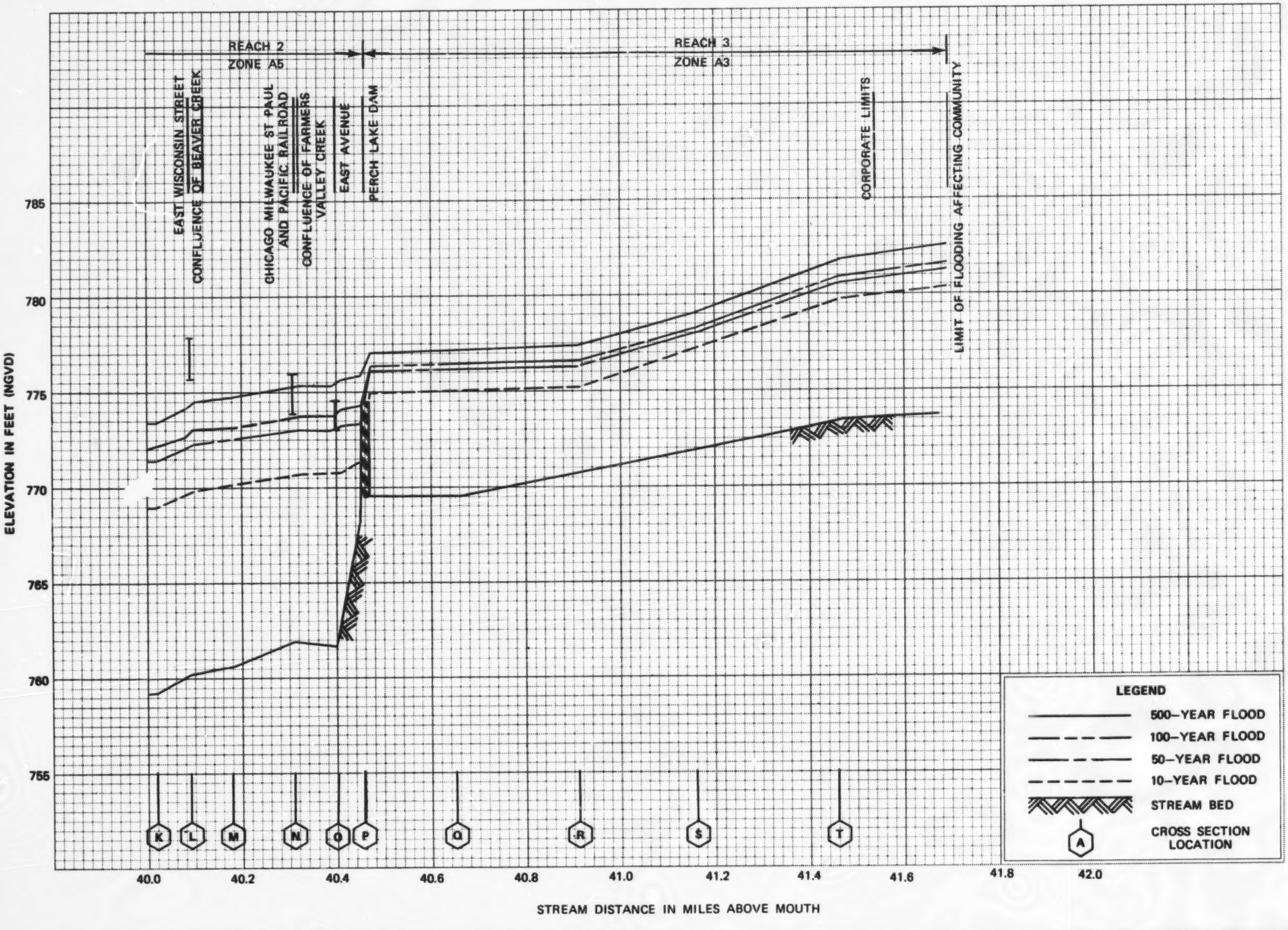

FLOOD PROFILES

LA CROSSE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

02P

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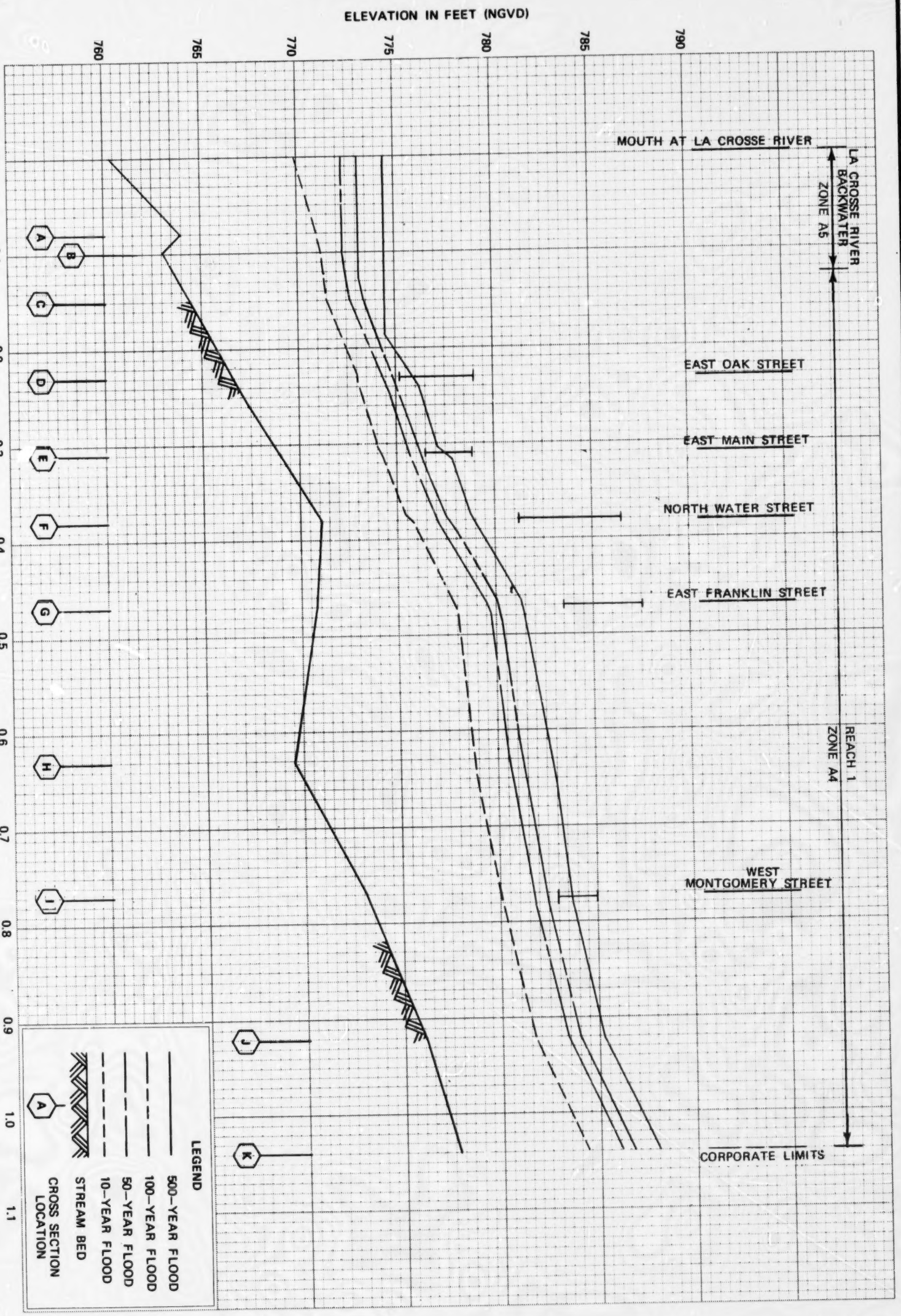

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI
(MONROE CO.)

03P

FLOOD PROFILES

BEAVER CREEK

19

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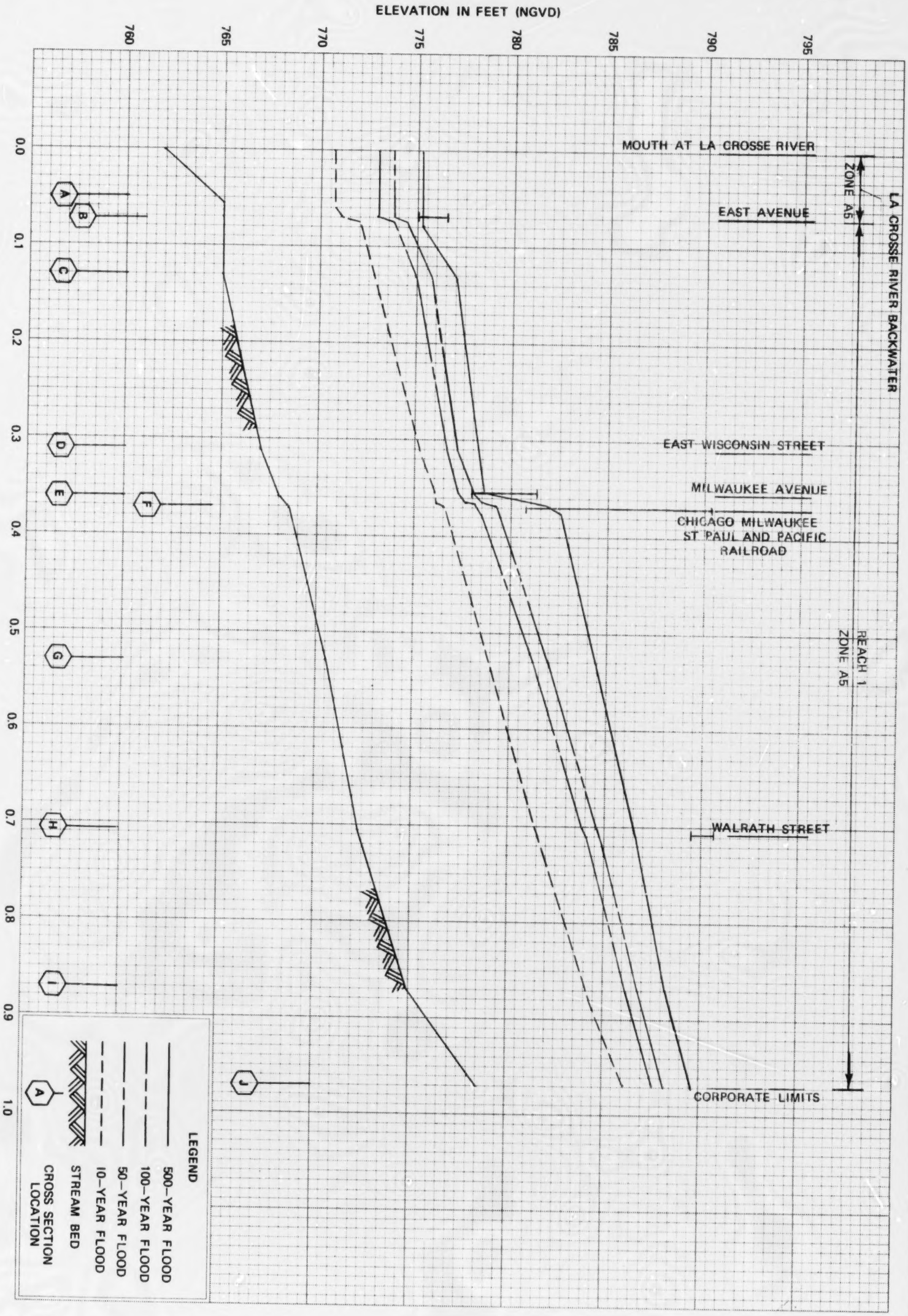

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF SPARTA, WI

(MONROE CO.)

FLOOD PROFILES

FARMERS VALLEY CREEK

04P

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